CLAIMS

1. A solid electrolytic capacitor comprising:

a porous sintered body of valve metal; and

a metal case accommodating the porous sintered body.

2. The solid electrolytic capacitor according to claim 1, further comprising a dielectric layer and a solid electrolyte layer which are formed at the porous sintered body, wherein the solid electrolyte layer acts as a cathode, the metal case is made of valve metal, and the metal case and the porous sintered body are electrically connected to each other to act as an anode.

3. The solid electrolytic capacitor according to claim 1, wherein the metal case includes a main plate portion, and a side plate portion standing from a periphery of the main plate portion, the main plate portion and the side plate portion defining a hollow for accommodating the porous sintered body.

4. The solid electrolytic capacitor according to claim 3, wherein the porous sintered body is flat and has a thickness which is smaller than a depth of the hollow of the metal case.

5. The solid electrolytic capacitor according to claim 3, wherein the porous sintered body includes a first surface, and a second surface opposite to the first surface, the first surface being bonded to the main plate portion of the metal case directly

or indirectly.

6. The solid electrolytic capacitor according to claim 5, wherein the first surface of the porous sintered body is bonded to the main plate portion of the metal case via a bonding material containing valve metal powder.

7. The solid electrolytic capacitor according to claim 3, wherein the metal case is provided with at least one anode terminal extending outward from the metal case.

8. The solid electrolytic capacitor according to claim 3, wherein the metal case is provided with a plurality of anode terminals extending outward from the metal case so that a current can flow through the metal case via the anode terminals.

9. The solid electrolytic capacitor according to claim 7, wherein the anode terminal is integrally formed on the side plate portion of the metal case.

10. The solid electrolytic capacitor according to claim 7, further comprising a metal member made of a same material as the metal case and bonded to the metal case, wherein part of the metal member serves as the anode terminal.

11. The solid electrolytic capacitor according to claim 5, wherein part of the solid electrolyte layer is provided on the

second surface of the porous sintered body, and wherein the solid electrolytic capacitor further comprises a metallic connecting member made of metal and bonded to said part of the solid electrolyte layer, part of the metallic connecting member serving as a cathode terminal.

12. The solid electrolytic capacitor according to claim 11, wherein the metal case is formed with a cutout, and wherein part of the metallic connecting member extends from inside to outside of the metal case by passing through the cutout.

13. The solid electrolytic capacitor according to claim 11, wherein the second surface of the porous sintered body includes a periphery formed with an insulating layer, and wherein said part of the solid electrolyte layer on the second surface is formed at a region surrounded by the insulating layer.

14. The solid electrolytic capacitor according to claim 13, wherein the insulating layer is made of resin, and wherein part of the resin is impregnated into a peripheral portion of the porous sintered body.

15. The solid electrolytic capacitor according to claim 1, wherein the metal case includes an irregular inner surface, and the inner surface is bonded to the porous sintered body.

16. The solid electrolytic capacitor according to claim 1,

wherein the metal case includes an inner surface to which a metal member made of valve metal is welded to form a projection.

17. The solid electrolytic capacitor according to claim 1, wherein the metal case includes an inner surface formed with a plurality of recesses and a plurality of burrs corresponding to the recesses.

18. The solid electrolytic capacitor according to claim 1, wherein the metal case includes an inner surface at which a plurality of projections are formed by partially bulging the metal case.

19. The solid electrolytic capacitor according to claim 1, wherein the metal case includes an opening which is closed with resin.

20. The solid electrolytic capacitor according to claim 1, wherein the metal case includes an outer surface which is at least partially covered with resin.

21. The solid electrolytic capacitor according to claim 1, further comprising a dielectric layer and a solid electrolyte layer formed at the porous sintered body, an anode wire partially extending into the porous sintered body, a metal member electrically connected to the anode wire and including a portion serving as an anode terminal, and a cathode terminal electrically

connected to the solid electrolyte layer.

22. The solid electrolytic capacitor according to claim 21, wherein the metal case is electrically connected to the solid electrolyte layer, and wherein the cathode terminal is provided at the metal case.

23. A method for manufacturing a solid electrolytic capacitor including a metal case and a porous sintered body accommodated in the metal case, the method comprising:

a first step of preparing the metal case; and

a second step of preparing the porous sintered body.

24. The manufacturing method according to claim 23, wherein the second step includes compacting valve metal powder put in the metal case to provide a porous body, and heating the porous body together with the metal case to provide a porous sintered body.

25. The manufacturing method according to claim 23, wherein the second step includes bonding a porous body of valve metal powder into the metal case by using a bonding material containing valve metal powder, and heating the porous body with the metal case to provide a porous sintered body.

26. The manufacturing method according to claim 23, wherein the second step includes bonding a porous sintered body of valve

metal powder into the metal case by using a bonding material containing valve metal powder.

27. The manufacturing method according to claim 23, wherein the first step includes subjecting a metal frame to drawing.

28. The manufacturing method according to claim 23, further comprising the step of forming a dielectric layer and a solid electrolyte layer at the porous sintered body;

wherein the porous sintered body includes a bonding surface bonded to the metal case and a non-bonding surface which is not bonded to the metal case, and wherein the step of forming the dielectric layer and the solid electrolyte layer comprises forming the dielectric layer and the solid electrolyte layer at an interior and the non-bonding surface of the porous sintered body.

29. The manufacturing method according to claim 28, wherein the metal case includes an opening defined by a plurality of side plate portions, and wherein the step of forming the dielectric layer and the solid electrolyte layer is performed by setting the metal case to be open upward and pouring treatment liquid for forming the dielectric layer or the solid electrolyte layer into the metal case through the opening.

30. The manufacturing method according to claim 28, further comprising the step of forming an insulating layer at a periphery

of the non-bonding surface of the porous sintered body before forming the solid electrolyte layer so that the insulating layer prevents the solid electrolyte layer from being formed at the periphery of the non-bonding surface.

31. The manufacturing method according to claim 28, further comprising the step of providing, after the formation of the dielectric layer and the solid electrolyte layer, a metal member at the non-bonding surface of the porous sintered body so that the metal member is electrically connected to the solid electrolyte layer, wherein part of the metal member is extended out of the metal case to act as a cathode terminal.

32. The manufacturing method according to claim 31, further comprising the step of loading resin into the metal case to seal part of the metal member with the resin after the metal member is provided at the non-bonding surface.

33. The manufacturing method according to claim 31, further comprising the step of covering an outer surface of the metal case with resin.